An Ecosystem Approach to Fish and Wildlife Conservation

Concept Document

U.S. Fish and Wildlife Service
February 1995

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Acknowledgement: Our thanks to the many people who reviewed our March 1994 draft. Your comments and suggestions were used to refine our approach, thus helping the Service to become a more effective partner in efforts to conserve fish and wildlife and the habitats upon which they depend.

Introduction

Purpose

This document revises the U.S. Fish and Wildlife Service's (Service) March 1994 Ecosystem Approach to Fish and Wildlife Conservation concept document. It describes how the Service uses an ecosystem approach to more effectively fulfill its mission and serve as a better partner in efforts to conserve fish and wildlife and their habitats. This revision reflects the evolution of our concept and the lessons learned in the first year of exploration and implementation. Ideas and suggestions from our employees, our partners, and other stakeholders have been invaluable in refining our approach. The Service's ecosystem approach continues to evolve as we learn from experience and from others.

This document will be incorporated into the Service Manual and will guide the Service's implementation of an ecosystem approach. Additional guidance will be developed as needed.

Ecosystem Approach: Background

Conservation literature over the last decade has increasingly fostered the idea that resource conservation can best be achieved by taking a more holistic approach to fish and wildlife management. Many parts of our society, including Federal agencies, the States, and the private sector (individuals, conservation groups, and industry), are experimenting with ecosystem-based approaches to help bring divergent interests together to seek common solutions.

"Ecosystem approach" is not a new concept—it was central to Aldo Leopold's eloquent discourses about conservation biology and the need for a "land ethic." Writers such as Thoreau and Muir stressed taking a holistic view of nature. Early ecologists such as Cowles, Forbes and Clements also stressed the importance of recognizing the role every organism plays in the overall scheme of an ecosystem.

According to current literature and the many ongoing State, Federal, and private efforts, an ecosystem approach generally can be characterized as follows:

- The primary goal is conserving natural biological diversity and ecosystem integrity, while supporting a sustainable level of human use.

- Common goals are developed, and management decisions are made with the participation of all internal and external stakeholders.

- Management decisions consider the full array of biological and socioeconomic parameters.

- Management decisions are made based on natural, ecologically defined boundaries.

- Managers recognize that ecosystems are dynamic and manage adaptively in response to changing biological and societal circumstances.

Building on decades of growing support for an ecosystem approach, Vice President Gore's National Performance Review called for "a proactive approach to ensuring a sustainable economy and a sustainable environment through ecosystem management." As part of implementing this approach, the White House's Office of Environmental Policy convened an Interagency Ecosystem Management Task Force to explore how Federal agencies can best contribute to ecosystem management efforts under way or emerging across the country. The Task Force's goal is to ensure the effectiveness of Federal efforts by establishing standards, identifying barriers that impede efficiency, and using what we have learned from existing ecosystem approach efforts to recommend solutions.

Today's natural resource managers are at a crossroads, similar to where our predecessors were nearly a century ago when they accepted the challenge to restore our Nation's depleted game populations. They faced what appeared to be insurmountable obstacles. Most of their attempts to overcome the obstacles were through trial and error, but in the long run, they were successful. The issues facing natural resource managers today have become extremely complex. We must learn how to protect natural resources while meeting the socioeconomic needs of a rapidly increasing world population. As did some of our predecessors, many may view our challenges as insurmountable. Our predecessors succeeded by taking risks, using innovation, continually trying new methods, and by working together. These same things are needed to tackle the resource issues facing us today.

The Service is eager to work with others in exploring and adopting an ecosystem approach. Our society places great value on fish, plants, wildlife, and the ecosystems upon which all species, including humans, depend. An ecosystem approach to fish and wildlife conservation is a common-sense, long-term strategy designed to maintain natural communities, while at the same time providing a sustainable level of recreational and economic security for the future. This is no small challenge, but one in which the Service must play a crucial role.

Fish and Wildlife Service's Adoption of an Ecosystem Approach

Service Mission and Mandates

The mission of the U.S. Fish and Wildlife Service is to:

> *conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people.*

An ecosystem approach to fish and wildlife conservation is a more effective way to address the Service's mission and its extensive array of statutory responsibilities. In order to meet the legal mandates established by laws such as the Endangered Species Act, Migratory Bird Treaty Act, Fish and Wildlife Coordination Act, the National Wildlife Refuge System Administration Act, and the North American Wetlands Conservation Act, the Service must work with all interests in an ecosystem, taking into account the legal mandates of other natural resource agencies and the broad needs of society. The species-specific, land-management, and project-oriented responsibilities arising from the Service's mission and mandates hinge on the perpetuation of stable, sustainable ecosystems and extensive collaboration with other Federal, State, Tribal, and private interests.

Goal of the Service's Ecosystem Approach

As the Service, working closely with others, carries out its mission and mandates, it will constantly strive to contribute to:

> *the effective conservation of natural biological diversity through perpetuation of dynamic, healthy ecosystems.*

This is an ambitious goal indeed, and the only hope for success lies in the coordinated efforts of many public agencies, private organizations, landowners, and citizens. Many Service programs and initiatives contribute to the conservation of biological diversity. Most obvious are actions that lead to the protection of habitat and the recovery of fish and wildlife populations in jeopardy. Less obvious, but equally significant, are actions that restore important habitats, reduce environmental degradation and contamination, monitor the integrity of natural systems, regulate the harvest of migratory birds, and provide technical assistance to private landowners. The Service cannot fulfill this goal alone. Only through an ecosystem approach where the Service works with others to conserve the Nation's biological heritage will the goal be realized.

In implementing an ecosystem approach to fish and wildlife conservation, the Service will emphasize three major areas:

- **Fulfill fish and wildlife needs in the context of the natural and human environment in which they occur.**

  An ecosystem approach to fish and wildlife conservation means protecting or restoring the function, structure, and species composition of an ecosystem while providing for its sustainable socioeconomic use. The Service is increasing its efforts to think and act in terms of systems, relationships, and processes. Because biological systems are dynamic, the Service will address all species as components of the dynamic systems within which they are found. Many of these systems require continued management.

- **Increase cross-program collaboration within the Service.**

  The Service has diverse authorities and numerous programs that have been established to carry out its legal mandates. We are working to increase the communication, coordination, and collaboration among all our programs. This integration will ensure that we use our resources most effectively, bringing many diverse talents to the table. Improved coordination will also enhance our efforts to work better with others.

- **Communicate, coordinate, and collaborate more frequently, more consistently, and more effectively with our partners, affected stakeholders, and the public.**

  The Service rarely controls or manages entire ecosystems. The actions and management of neighboring public and private lands strongly influence the ecological integrity of National Wildlife Refuges. Similarly, endangered and migratory species use lands beyond those specifically established to provide for their conservation. The Service will work closely with everyone who shares responsibility for sustaining ecosystems: other Federal agencies, States, Native American tribes, communities, corporate and individual landowners, various organizations, and the general public.

Partnerships

Partnerships are not new to the Service or natural resource management, but never has the recognition of partners and the need to work together been so keen. A potential partner is any organization or individual with responsibilities or interests in an ecosystem. An ecosystem approach needs the full support of all appropriate partners in a given area to succeed.

In implementing an ecosystem approach, the Service participates as one member of a very diverse management team. Our responsibilities and interests vary from one ecosystem to the next. Consequently, the Service's role ranges from leader to catalyst to worker to minor participant. While our mission and mandates shape our advocacy for fish and wildlife resources, we also respect the interests and concerns of other stakeholders and realize the true value of partnerships.

Adopting an ecosystem approach will increase our need for diverse expertise, not just from ecologists, but from hydrologists, geologists, landscape architects, and social scientists. We increasingly recognize that we need to look to other Federal agencies, the States, and the private sector to obtain expertise or skills not readily available in the Service to meet these diverse needs. This is one of the most cost-effective aspects of an ecosystem approach.

The Service's collaboration with its traditional partners—State natural resource agencies, environmental organizations, outdoor sporting groups, and oth ers—will remain vital in implementing an ecosystem approach. But other partners also must be engaged in this effort—industry, local governments, and private landowners, to mention a few. Traditionally many of our employees and partners have been from predominately rural and/or hunting, fishing, and nature-watching backgrounds. More recently, the Service has become aware of the increasing appreciation of the environment among urban constituencies and is expanding its collaboration with this segment of the public.

We have had considerable success conserving resources with the North American Waterfowl Management Plan Joint Ventures, Partners for Wildlife Program, Coastal Ecosystems Program, Partners in Flight, Watchable Wildlife Program, Challenge Cost Share Program, and other associations. These affiliations have taught us that successful, productive partnerships require:

- shared vision, goals, and commitment by all partners;
- flexibility, adaptability, and good communication;
- understanding of the mission and needs of all partners;

- respect for differing perspectives;
- teamwork;
- an appreciation of what partnerships can do to increase results; and
- persistence.

The Service views increased and improved partnerships as critical to its success. Without strong partnerships, independent initiatives will continue to be disjointed, competitive, and limited in effectiveness.

"A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."

Aldo Leopold

Principles of the Service's Ecosystem Approach

There is general agreement among Federal and State agencies and the private sector on the underlying principles of an ecosystem approach. The principles listed below are tailored to the Service's adoption of an ecosystem approach, but are based largely on those developed by the Interagency Ecosystem Management Task Force.

- *Recognize that economic sustainability and societal well-being depend upon conservation of healthy ecosystems.*
- *Consider and incorporate environmental and socioeconomic factors and interests into goal-setting and implementation.*
- *Base decisions on the best available science and data, and ensure that information is of high quality.*
- *Recognize that conservation of fish and wildlife must address processes at varying scales.*
- *Recognize that the dynamics and resiliency of ecosystems vary.*
- *Stress prevention of degradation over mitigation or restoration.*
- *Involve all stakeholders in developing and achieving the desired conditions for the ecosystem.*
- *Adopt an interdisciplinary, coordinated approach; all stakeholders integrate expertise, resources, and tools to achieve results.*
- *Practice flexibility and innovation.*
- *Practice adaptive management: monitor and evaluate outcomes, and readjust management direction accordingly.*
- *Incorporate information from all organizational levels and sectors into decision-making processes. Delegate decisions to the lowest appropriate level, and give employees maximum possible authority.*

Delineation of Ecosystem Units

National Ecosystem Mapping

There have been numerous attempts to delineate ecosystems on a national scale, using a wide variety and combination of biological, physical and geoclimatic characteristics. Yet, no single mapping system or scale can capture all the information necessary to fully support an ecosystem approach to fish and wildlife conservation. Indeed, mapping strategies should be flexible and dynamic, much like the information they portray.

The Service has chosen the U.S. Geological Survey's Hydrologic Unit Map as the foundation for organizing and managing its diverse staff resources and program capabilities. This mapping strategy, based upon the delineation of watersheds, was chosen for several reasons including:

- Watersheds are discrete physical units that provide widely recognized and generally well-defined boundaries.

- Watersheds, by their hierarchical structure, lend themselves to a flexibility of scale necessary in a realistic and effective ecosystem approach.

- Watersheds are of major ecological importance and provide an appropriate focus for aquatic, coastal, and estuarine habitats, in particular. Approximately 45% of the Nation's threatened and endangered species directly depend on aquatic and wetland habitats.

- Watersheds provide a vehicle to consider the critical linkages between upstream and downstream effects.

The Service initially identified 52 "ecosystem units" by grouping or, in some cases, segmenting watershed units. Vegetation cover types, physiography, and optimum size were considered in the grouping of watersheds. The size of each ecosystem unit also reflects consideration of the amount of land area that can be effectively addressed and the commonality of resource issues.

Over the past year, some ecosystem units were deleted from or added to the map, and the boundaries of other units were adjusted to reflect additional information and the views of Service partners. The Service remains flexible to consideration of future adjustments to the national map. Developing and mapping pertinent ecological information on a national scale to support conservation initiatives will continue in cooperation with other agencies.

Use of "Focus Areas"

The Service's watershed-based map provides a suitable framework around which to mobilize diverse staff resources. However, the most appropriate ecosystem boundaries can often be defined by the issues or problems to be resolved, resulting in delineation of areas on a scale much smaller than the Service's ecosystem units. Focus areas allow the Service to adapt to ongoing State, regional, or other management initiatives. In other cases, ecosystem planning boundaries may be determined by legislation. The ecosystem approach is intended to be flexible enough to allow the Service and its partners to customize the area of focus to fit the issue at hand.

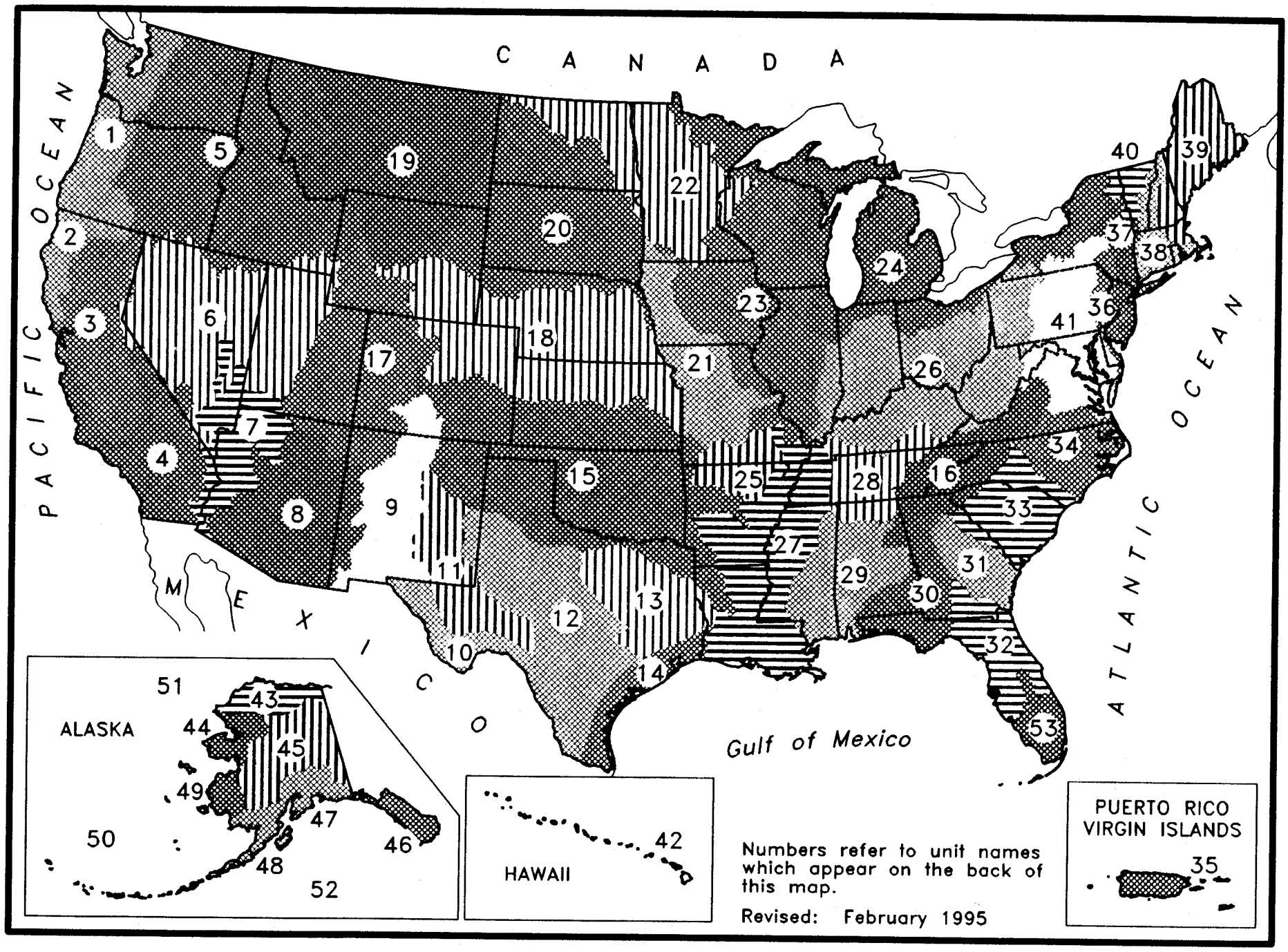
Working Across Ecosystems

The Service's watershed map does not preclude the need to address important conservation objectives on larger spatial scales. Fish and wildlife population and habitat goals are based upon species biology, population dynamics, and ecological processes that may be international in scope (e.g., migratory waterfowl). Service managers must think and function at multiple scales simultaneously. Planning and implementation of management actions within the Service's ecosystem units must be flexible enough to address site-specific conservation priorities and reflect the broader population and habitat needs of widely ranging species.

> "The practices we now call conservation are, to a large extent, local alleviations of biotic pain. They are necessary, but they must not be confused with cures. The art of land doctoring is being practiced with vigor, but the science of land health is yet to be born."
>
> *Aldo Leopold*

U.S. FISH AND WILDLIFE SERVICE ECOSYSTEM APPROACH

Watershed Based Units



Numbers refer to unit names which appear on the back of this map.

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U.S. Fish and Wildlife Service

Unit	*Name*	*Lead Region*
1.	North Pacific Coast	1
2.	Klamath/Central Pacific Coast	1
3.	Central Valley of California/ San Francisco Bay	1
4.	South Pacific Coast	1
5.	Columbia River Basin	1
6.	Interior Basins	1
7.	Lower Colorado River	2
8.	Gila/Salt/Verde River	2
9.	Middle and Upper Rio Grande	2
10.	Lower Rio Grande	2
11.	Pecos River	2
12.	Edwards Plateau	2
13.	East Texas	2
14.	Texas Gulf Coast	2
15.	Arkansas/Red Rivers	2
16.	Southern Applachians	4
17.	Upper Colorado River	6
18.	Platte/Kansas Rivers	6
19.	Upper Missouri/ Yellowstone Rivers	6
20.	Missouri Main Stem	6
21.	Lower Missouri River	3
22.	Mississippi Headwaters/ Tallgrass Prairie	3
23.	Upper Mississippi River/ Tallgrass Prairie	3
24.	Great Lakes	3
25.	Ozark Watersheds	3
26.	Ohio River Valley	5
27.	Lower Mississippi River	4
28.	Tennessee/Cumberland River	4
29.	Central Gulf Watersheds	4
30.	Florida Panhandle Watersheds	4
31.	Altamaha Watershed	4
32.	Peninsular Florida	4
33.	Savannah/Santee/ Pee Dee Rivers	4
34.	Roanoke/Tar/Neuse/ Cape Fear Rivers	4
35.	Caribbean	4
36.	Delaware River/Delmarva Coastal Area	5
37.	Hudson River/New York Bight	5
38.	Connecticut River/Long Island Sound	5
39.	Gulf of Maine Rivers	5
40.	Lake Champlain	5
41.	Chesapeake Bay/ Susquehanna River	5
42.	Pacific Islands	1
43.	Arctic Alaska	7
44.	Northwest Alaska	7
45.	Interior Alaska	7
46.	Southeast Alaska	7
47.	South Central Alaska	7
48.	Bristol Bay/Kodiak	7
49.	Yukon - Kuskokwim Delta	7
50.	Bering Sea/Aleutian Islands	7
51.	Beaufort/Chukchi Seas	7
52.	North Pacific/Gulf of Alaska	7
53.	South Florida	4

Service Ecosystem Teams

Basic Team Concept

An ecosystem approach is helping to unify the Service's diverse programs. The Service has formed ecosystem teams for each of the ecosystem units identified on the map. The teams include personnel from all Service programs. The Service is setting new internal standards for teamwork, creativity, flexibility, and communication between its operational units and with all its partners. By increasing coordination among our varied programs, the Service's position on important issues becomes more unified, which helps the Service become a better partner. The ecosystem teams are working closely with the Service's traditional partners and are expanding these partnerships to include others.

The following is the Service's basic model for ecosystem team activities:

1. A cross-program team of Service employees is identified for each ecosystem.

2. Each team selects a leader or single point of contact to serve as a liaison, coordinator, and/or facilitator.

3. Teams identify preliminary ecosystem goals, objectives, action strategies, and potential partners.

4. Teams meet with partners to identify common ecosystem goals and collaborative efforts that can contribute to meeting those goals.

5. Priorities are established for Service actions.

6. Teams complete Service ecosystem plans, which describe goals, objectives, action strategies, field facility contributions to the actions needed (what and when), contribution of partners, and 3-year Service budget needs.

7. Teams implement collaborative projects across Service programs and with partners.

8. Teams continuously work with partners and review ecosystem plans and budgets, readjusting them as needed.

Cross-Region Ecosystem Teams

Ecosystem teams in multi-region ecosystems contain members from all regions involved. A lead region for each multi-regional ecosystem was designated in

April 1994 and is identified on page 11. Leads already established for endangered species and other activities remain unchanged. The lead region's interregional responsibilities are facilitation, coordination, and liaison, not management, direction, or supervision. The lead region is responsible for coordinating plans, progress reports and evaluations, and submitting ecosystem budget proposals.

Service Directorate: Vision, Leadership, and Support

The Service Directorate functions as the National Facilitation Team, making Servicewide policy decisions and providing overall vision, leadership, and general implementation guidance. Support is provided by removing hurdles and fostering an atmosphere conducive to a cooperative, field-based ecosystem approach.

Washington Office Coordination Team: Implementation Guidance

Within the Washington Office, a cross-program team of managers, primarily Deputy Assistant Directors and Division Chiefs, has been established to assist with national implementation and coordination of the Service's ecosystem approach. The role of this team is to increase cross-program interaction and collaborate on cross-cutting issues at the Washington Office level, represent the Service on various interagency committees and task forces, and prepare national ecosystem approach guidance. The team is responsive to needs identified by the Directorate.

Regional Office: Direction and Support

The Regional Directorate functions as a cross-program Regional Facilitation Team to provide guidance and oversight; coordinate between the ecosystem teams; and consolidate goals, priorities, and budgets at the Regional Office level. The most important role of the Regional Facilitation Team is to help the ecosystem teams accomplish actions they cannot otherwise accomplish themselves.

Ecosystem Planning/Action Framework

The Service's focus is on action; planning is to be completed quickly, and action to bring about solutions will follow immediately. The intent of the plans is to concisely identify issues and problems, solutions, and the funds and staff to implement solutions. Combining and leveraging Service resources with those of others will allow us to achieve greater on-the-ground results. The planning/action framework that has worked well in some existing ecosystem approach efforts is described below. There is nothing rigid about this framework; what works at the local level and gets good results is the right approach. This framework can also be applied to areas of more intense activity (focus areas) within the ecosystem.

1. ***Identify natural resource needs*** — This involves examining important ecosystem components from a historical perspective, how they have changed over time, and why. It is important to understand the status and trends of fish and wildlife and their habitats, and relationships and processes within and between ecosystems. Teams can review existing data and proceed, while continuing to identify additional information needs. Information requirements to support decisions change, especially in the areas of inventory, monitoring, ecological processes, demographics, socioeconomics, and techniques development. There are several potential partners in meeting information needs, including the States, universities, conservation organizations, and industry.

2. ***Set Resource Goals and Objectives*** — Goals and objectives are established to guide Service activities in each ecosystem unit and, more specifically, in focus areas.

   Goals: Goals reflect desired future conditions in the ecosystem. Goals should be few in number and achievable. Goals can reflect priority species or groups of species, habitat types of significance to Service trust resources, or important focus areas within the ecosystem unit. Goal statements are broad and should incorporate the following concepts:

   - perpetuation of natural communities of plants and animals;
   - maintenance of naturally-occurring structural and genetic diversity;
   - needs of rare and ecologically important species;
   - minimization of habitat fragmentation;
   - maintenance of uncontaminated land and water;
   - continued role of natural processes (e.g., fire, floods);

- control of undesirable exotic species; and
- maintenance of compatible, sustainable human activities.

Objectives: Each goal should step down to one or more objectives. Objectives are more specific and quantifiable than goals, and are a means of measuring progress. Objectives can be expressed in terms of water quality parameters; acreage, location, and quality of habitat; populations stabilized, increased, or protected; or any other quantifiable ecological parameters. Objectives should be specific enough that progress and effectiveness can be measured and evaluated.

3. ***Identify and Implement Needed Action Strategies*** — Suggested action strategies should be developed to achieve each objective identified. Solutions will make the most efficient and integrated use of our many tools such as land acquisition, land protection easements, refuge management, habitat restoration, natural resource damage assessment, landowner assistance, endangered species recovery, regulatory evaluations, fish restoration, Federal Aid programs, outreach, and education. Action strategies should be prioritized and specify which facility will do what by when. Implementation should involve public and private partners and leveraging of resources whenever possible.

4. ***Budget Development*** — Funding to implement ecosystem actions will come from the existing base budget and potential future increases. Each ecosystem team will develop and periodically update a 3-year budget to support the goals, objectives, and action strategies identified. The budget should include the following:

   - current base funding by field facility/activity;
   - how each facility's/activity's base funding is applied to the priority action strategies;
   - opportunities for cross-program leveraging of funding to implement priority action strategies; and
   - highest priority funding and FTE increase needs based on the action strategies.

5. ***Monitor and evaluate*** — Monitoring and evaluating progress and reporting results are integral components of an ecosystem approach, as is periodic review of plans and priorities. Feedback to the needs assessment and goal-setting steps is critical.

Agency Readiness and Training

The Service is exploring how to better equip itself to implement an ecosystem approach to fish and wildlife conservation. To ensure that all our employees, non-biologists as well as biologists, have a common understanding of our approach, we are developing and providing training courses and seminars in the basics of ecology and an ecosystem approach. We are also making these courses and seminars available to partners.

One of the Service's National Education and Training Center's (NETC) priorities is to help improve employees' skills to make them more successful at implementing an ecosystem approach, which ultimately will make the Service a better partner. The NETC is developing and providing courses on topics such as team building, team effectiveness, transition management, facilitation skills, negotiation, partnerships, conducting effective meetings, outreach, managing change, and others as needs arise. The Service has developed a document, *Resources for Assisting in Implementing an Ecosystem Approach*, which lists trained facilitators inside and outside the Service, education programs available through NETC, and additional readings on ecosystem management. NETC will periodically update this resource guide.

Service organizational structure, budget processes, communication processes, and performance management systems will all be examined and modified as needed to foster a climate conducive to implementing an ecosystem approach.

> "It is from the earth that we must find our sustenance; it is on the earth that we must find solutions to the problems that promise to destroy all life here."
>
> *Justice William O. Douglas*

Evaluation Process and Practicing Adaptive Management

From the outset of implementing an ecosystem approach, the Service recognized the need to evolve and adapt through the learning process. During the first year, we conducted periodic evaluations and made modifications to our approach based on the outcome of the evaluations. We will continue with periodic evaluations at different levels as we continue to refine our approach. Annual evaluations will become standard in the future. At the national level, we will continuously assess whether our ecosystem approach is:

- increasing our effectiveness in conserving fish and wildlife;
- increasing and improving cross-program coordination and collaboration within the Service; and
- increasing the frequency and quality of our partnerships.

At the Regional and Field Office level, we will examine the goals, objectives, and priorities set by the ecosystem teams to see if they are being met or need to be modified. Ideas, methods, and actions that were successful as well as those lessons learned will be shared among our teams. From this testing and sharing, effective methods will be adopted nationwide so pitfalls can be avoided. Practicing adaptive management on a national level relative to our overall ecosystem approach, as well as within each of our ecosystem units, will be critical to our success.

Conclusion

Conventional paradigms of fish and wildlife management must evolve to meet the challenges of the future. The rise in endangered species listings and the decline in migratory birds and aquatic resources, such as anadromous fish, indicate that our best management efforts have not been enough. Resource managers must accept the reality that fish and wildlife populations and habitats will experience increasing impacts from human activities, the threat of which will require extraordinary flexibility and innovation on the part of our management systems. An ecosystem approach offers a promising method of meeting this challenge. The Fish and Wildlife Service is eager to work closely with others to explore, adopt, and further this approach.

We recognize change does not come easily or quickly. By rolling up our sleeves and working diligently with others, we hope to provide future generations of natural resource managers with more effective tools to protect our biological heritage and provide for the continued recreational and economic use of natural resources.

We recognize the Service is only one of many players in any ecosystem approach project. Our focus will continue to be on our mission and mandates (e.g., migratory birds, anadromous fish, endangered species, wetlands, National Wildlife Refuge System). We need assistance from the States and other partners to more effectively accomplish our mission, and we hope we can offer support to other organizations with complementary objectives. Our ability to build strong partnerships to achieve ecosystem goals that result in net gains for fish and wildlife will be the true test of whether our ecosystem approach is successful.

We will continue to evolve and improve our approach based on input from all programs and levels of the Service and from all our partners. We remain open to all suggestions.

Definitions

As the Service implements an ecosystem approach to fish and wildlife conservation, we need a common language. The following definitions have been adopted; others will be added as needed. The definitions reflect a synthesis of the many definitions that can be found in ecology literature. Some are followed by additional definitions taken from the literature.

Adaptive Management: *Management that acknowledges uncertainty and the value of experimentation and learning from experience.*

Biodiversity: *The variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur.*

The variety of organisms considered at all levels, from genetic variants belonging to the same species through arrays of species to arrays of genera, families, and still higher taxonomic levels; includes the variety of ecosystems, which comprise both the communities of organisms within particular habitats and the physical conditions under which they live [Wilson, 1993].

Cross-program: *Communication and cooperation between multiple programs. The Service is organized into programs such as Refuges, Migratory Birds, Law Enforcement, Fisheries, International Affairs, Endangered Species, and Environmental Contaminants.*

Ecosystem: *Dynamic and interrelating complex of plant and animal communities and their associated non-living environment.*

The interacting populations of plants, animals, and microorganisms occupying an area, plus their physical environment. The living organisms in an ecosystem are collectively called a community, sometimes natural community or biotic community [Hunter, 1990].

A biological community is defined by the species that occupy a particular locality and the interactions between those species. A biological community together with its associated physical environment is termed an ecosystem [Primack, 1993].

Ecosystem Approach: *Protecting or restoring the natural function, structure, and species composition of an ecosystem, recognizing that all components are interrelated.*

Management of natural resources using systemwide concepts to ensure that all plants and animals in ecosystems are maintained at viable levels in native

habitats and that basic ecosystem processes are perpetuated indefinitely [Clark and Zaunbrecher, 1987].

Ecosystem Unit: *An area delineated on the Service's watershed-based map.*

Focus Area: *Within an ecosystem unit, an area where more local and concentrated effort is appropriate.*

Natural: *Substantially unaffected by human activities.*

Sustainability: *The ability to maintain ecological processes and functions, biological diversity, and productivity over time.*

Watershed: *The area drained by a river or stream and its tributaries.*

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